

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOHRU OGAWA

Appeal No.2000-1112
Application No. 08/518,363

ON BRIEF

Before BARRETT, DIXON, and GROSS, Administrative Patent Judges.
GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 59, 62 through 64, and 68. Claims 2 through 58 have been canceled. Claims 60, 61, 66, 67, and 69 through 71 have been allowed.¹

Appellant's invention relates to a method and apparatus for forming a pattern on a substrate, the method including the use of a phase shifting mask. Claim 1 is illustrative of the claimed invention, and it reads as follows:

¹ We note that although claim 65 was neither canceled nor indicated as allowable, it has not been rejected and, therefore, is not before us on appeal.

1. A method of pattern formation comprising:

irradiating light from an effective light source to a phase shifting mask, wherein said effective light source has a center portion, said center portion being 10 to 40 % of an outer diameter of said effective light source, and

with said irradiated light, transferring a pattern of the mask onto a substrate,

wherein an amount of light emitted from said center portion of said effective light source is less than a peak amount of light emitted from peripheral portions of the effective light source by 2 to 90 percent.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Suzuki et al. (Suzuki)	5,305,054	Apr. 19, 1994
Shiozawa et al. (Shiozawa I)	5,345,292	Sep. 06, 1994
Muraki	5,363,170	Nov. 08, 1994
Shiozawa (Shiozawa II)	5,459,547	Oct. 17, 1995

(filed Jun. 25, 1993)

Burggraaf, Pieter, "Lithography's leading edge, Part 1: Phase Shift Technology," Semiconductor International (Feb. 1992), pp. 42-47.

Claims 1, 59, and 62 through 64 stand rejected under 35 U.S.C. § 103 as being unpatentable over Muraki, Shiozawa I, or Shiozawa II in view of Burggraaf.

Claims 1, 59, 62 through 64, and 68 stand rejected under 35 U.S.C. § 103 as being unpatentable over Suzuki in view of Burggraaf.

Reference is made to the Examiner's Answer (Paper No. 32, mailed December 20, 1999) for the examiner's complete reasoning in support of the rejections, and to appellant's Brief (Paper

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No. 30, filed October 12, 1999) and Reply Brief (Paper No. 33, filed December 7, 1999) for appellant's arguments thereagainst.

OPINION

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellant and the examiner. As a consequence of our review, we will affirm the obviousness rejection of claims 1, 59, 62 through 64, and 68.

As the examiner notes (Answer, page 12), appellant "does not dispute the examiner's contention that the apparatus and process of use of the primary reference exemplifies each and every aspect of the invention, except for the use of phase shift masks with that apparatus." Appellant does not contest this assertion. Accordingly, the only issue is whether it would have been obvious to use the phase shift mask of Burggraaf in the methods/systems of Muraki, Shiozawa I, Shiozawa II, and Suzuki. Furthermore, appellant states (Brief, pages 8 and 9) that with regard to the use of a phase shift mask, the texts of Shiozawa I, Shiozawa II, and Suzuki are all identical to that of Muraki. Accordingly, we will discuss only the combination of Muraki and Burggraaf.

Appellant asserts (Brief, page 6) that Muraki "expressly considers the merits of a phase shifting mask and rejects them as inappropriate." Appellant further argues that Burggraaf

"describes phase shift masks as being an inchoate, developing technology that may or may not prove useful. The cover page questions whether phase shift [sic] technology can improve lithography performance or whether the inspection and repair demands of phase shift technology will prevent it from being useful." Appellant also points to Burggraaf's indication that phase shift technology "does not improve the accuracy of all existing steppers." Appellant concludes (Brief, page 8) that the above-noted teachings of the two references would have led the skilled artisan away from the examiner's proposed combination.

We disagree with appellant. Muraki does expressly consider the merits of a phase shifting mask, but rejects them for the particular application contemplated in that patent. Muraki actually indicates that phase shift masks improve resolution (column 1, lines 51-54), however under certain circumstances, it is difficult (though not necessarily impossible) to use a phase shift mask (column 2, lines 1-20). Thus, Muraki teaches that phase shift masks are beneficial, but also have drawbacks. That means one of ordinary skill would have to weigh the benefits against the drawbacks for any particular application; it is not a teaching away as indicated by appellant.

Similarly, Burggraaf teaches that a phase-shift reticle has the benefit of increasing image contrast and resolution, but the

disadvantage of being complex and not improving the accuracy of all existing steppers. Again, this is not a teaching away, but rather a suggestion that the benefits and drawbacks must be weighed against each other for any given application.

Accordingly, contrary to appellant's arguments (Reply Brief, page 2), the disclosures of Muraki (and, thus, of Shiozawa I and II and Suzuki) and of Burggraaf are not "persuasive evidence that one of skill in the art . . . would have been lead away from the use of a phase shifting mask," but rather evidence that phase shifting masks are beneficial in certain situations as long as one can tolerate the disclosed drawbacks. Therefore, we will sustain the rejection of claims 1, 59, and 62 through 64 over Muraki in view of Burggraaf.

In addition, since the disclosures of Shiozawa I and II and Suzuki are the same as Muraki with regard to the use of a phase shifting mask, the same analysis provided above applies to the rejections of the claims over each of the three additional references in view of Burggraaf. Accordingly, we will affirm the rejections of claims 1, 59, and 62 through 64 over Shiozawa I and II in view of Burggraaf and also of claims 1, 59, 62 through 64, and 68 over Suzuki in view of Burggraaf.

CONCLUSION

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The decision of the examiner rejecting claims 1, 59, 62 through 64, and 68 under 35 U.S.C. § 103 is affirmed.

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 C.F.R.
§ 1.136(a).

AFFIRMED

LEE E. BARRETT)	
Administrative Patent Judge)	
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JOSEPH L. DIXON)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS
)	AND
)	INTERFERENCES
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ANITA PELLMAN GROSS)	
Administrative Patent Judge)	

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